

# A Templatic Approach to Linguistic Rhythm

Yukio Takahashi

## Introduction

One of the basic insights of the theory of Metrical Phonology is that entities of phonological hierarchy are organized by relative binary oppositions that are represented as S (trong) vs. W (eak). The insight is mainly supported by analyses of linguistic rhythm and stress. Included among them are Liberman and Prince (1977), Hayes (1995), and Kiparsky (1979). Kiparsky extended the theoretical concept of Metrical Phonology to the analysis of low-level phonetic alternations of English (i.e., Aspiration, Flapping and Glottalization): the basic machinery of the system consists of (i) Universal Template of the Syllable and (ii) Strength Hierarchy of Segments (we may add language-specific stipulations on the interaction of the two principles, e.g., "in English onsets, /s/ is weaker than plosive consonants"). The present paper investigates theoretical and empirical consequences of the introduction of the notion "template" into the theory of Metrical Phonology, focusing on two topics from English: (i) glottal stop insertion and (ii) rhythmic adjustment of phrasal stress.

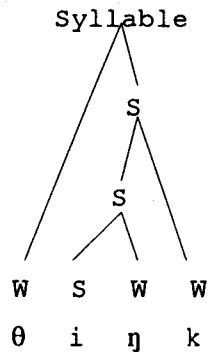
## 1 Phonological Null Elements

The idea of template in Metrical Phonology necessarily involves some form of hierarchy consisting of S-W pairings of phonological elements. Therefore there may be cases where certain slot(s) in phonological representation will not be satisfied by phonologically existing elements. In this section I would like to take up two cases of phonological phenomena that I assume to be related with phonological null elements.

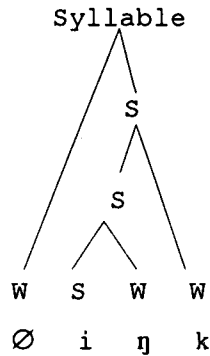
### 1.1 Glottal Stop Insertion

The theoretical innovation of the notion "template" that Kiparsky introduced has a significant consequence to a reevaluation of connected speech. The notion implies the existence of "null element" in the phonological representation:

(1) a. think



b. ink



The intrusion of the abstract null element in the initial slot in (1b) is not avoidable because the uppermost node of the syllable necessarily branches into [W S] universally. A closer observation of the pronunciation of the word (1b) will reveal that it has a glottal stop before the vowel /i/. The realization of the stop can be accounted for by a last resort to the Default:

(2) Default Rule for Glottal Stop Insertion

[ ] &gt; [+constricted glottis]

The application of the default will be evoked by the principle (3):

(3) Avoid Zero.

The rule (2) will be applied to the segmental string (1a) in order to satisfy the principle (3). The autosegmental spreading of phonological features may in general be argued to be forced by the principle (3).

## 1.2 Connected Speech

The phenomenon of connected speech will be partially be attributable to the interaction of the principle (3) and the last resort to a certain phonological system related with the internal structure of the syllable. Let us begin with our examination of the syllable structures of the phrases in (4):

- (4) a. a portion of the story  
 b. the motivation for the condition

The phrases in (4) may be uttered in one go. In (4a) the preposition "of" may naturally be connected to the noun to its left, "portion," while in (4b) the preposition "for" can by no means be linked to the word to its left, "motivation."

The explanation of the difference in the behavior found in (4) is rather straightforward: the preposition "of" has a phonological null element in its initial segmental slot, while the preposition "for" does not. By the principle the empty slot should somehow be linked to some phonological element. We have two candidates at this stage of the story: (i) the default insertion of the glottal stop and (ii) resyllabification. In fact, we may recognize two types of pronunciation with respect to (4a): (i) it is highly probable that the /n/ of "portion" is linked to "of" and (ii) it is not impossible though not commonly observed that a glottal stop appears before "of." The second case may be restricted to a highly formal case or in a case where a heavy stress is placed on the prepositional phrase.

We may refer to the Elsewhere Condition and assume that the default insertion of the glottal stop will be executed by a general phonological rule and that the resyllabification is a rather special phonological procedure. In normal states of affairs, the resyllabification procedure will be applied prior to the segmental insertion.

## 2 Phrasal Stress Adjustment as a Last Resort

In this section I will analyze the functioning of the machinery of template and go on to formulate a universal template to capture generalizations concerning rhythmic alternations within phrases.

### 2.1 Template in Metrical Phonology

Template is an idealized alignment of linguistic entities of varied sorts. In broader interpretation of the term, it may include semantic restrictions on arrangement of thematic roles in a clause: e.g., the Thematic Hierarchy Condition on Passivization in English as formulated by Jackendoff (1972, 1990):

## (5) The Thematic Hierarchy Condition on Passivization

The thematic role of the by-phrase must be higher on the Thematic Hierarchy than that of the derived subject of the sentence.

The condition (5) interacts with the Thematic Hierarchy of Thematic Roles to produce certain sets of predictions on acceptabilities of sentences:

## (6) Thematic Hierarchy

- a. Actor
- b. Location, Source, Goal
- c. Theme

We may notice that Kiparsky's (1979) syllable template coupled with the Strength (Sonority) Hierarchy of phonological segments brings about linguistically significant generalizations concerning the low-level phonetic alternations of English. It is crucial to note that Jackendoff's semantic analysis and Kiparsky's Metrical treatment share a similarity of systematic organization: semantic or phonological template coupled with universal semantic or phonological hierarchy of linguistic entities.

Given the present state of the development of the theoretical studies of Jackendoff's Conceptual Semantics and Kiparsky's Metrical Phonology, I have to avoid too bold a cross-theoretical generalization concerning the two modules of the semantic and phonological systems, i.e., the template and the hierarchy. In the remainder of the paper, I would like to pursue the possibility of a reformulation of Hayes' (1984) notion of eurhythmy within the general framework of Metrical Phonology that internalizes the system of rhythmic template.

## 2.2 Template for Eurhythmy

Two systems are assumed here to govern eurhythmy: Bisyllabic and Quadrisyllabic Eurhythmy. The first system is dubbed here as "Bisyllabic Eurhythmy":

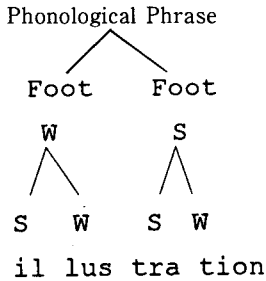
## (7) Bisyllabic Eurhythmy

- a. Avoid Zero
  - Spread Alpha
- b. Bisyllabic Template

Stressed syllables cannot occur in a position adjacent to another stressed syllable.

The case that directly satisfies the template in (7b) is exemplified by *illustration*:

- (8) Metrical structure of
- illustration*
- above the syllable level

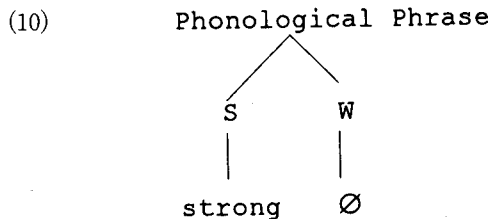


In (8) strong metrical elements alternate with weak metrical elements.

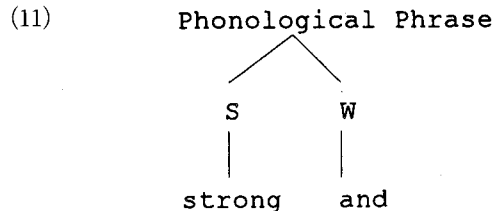
Contrastively monosyllabic words do not satisfy (7b) in isolation. Let us compare words in (9a) with those in (9b).

- (9) a. strong, words  
 b. strong and weak  
 words in the sentence

A brief contrastive observation of words in (9) would reveal that the vowels in words in (9a) are longer than those in the initial syllables of the sequences in (9b). Our explanation is rather straightforward: the length of the vowels in (9a) is due to a spreading of the melodies of the vowels onto the vacant slots to their right in order to avoid zero. The metrical structure of words in (9a) may be diagrammatized as in (10):



The corresponding part in (9b) will be represented as:



In (11) there is no vacant slot onto which the spreading may take place.

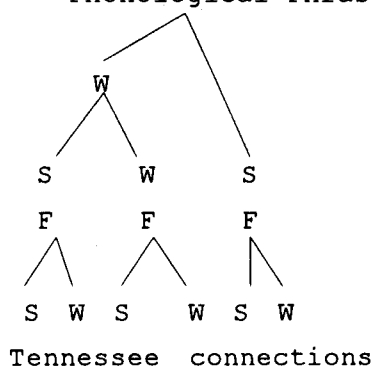
The second system of rhythmic adjustment is Quadrisyllabic Eurhythmcy, which is defined on the basis of the notion "designated terminal element" (DTE):

(12) Quadrisyllabic Eurhythmcy

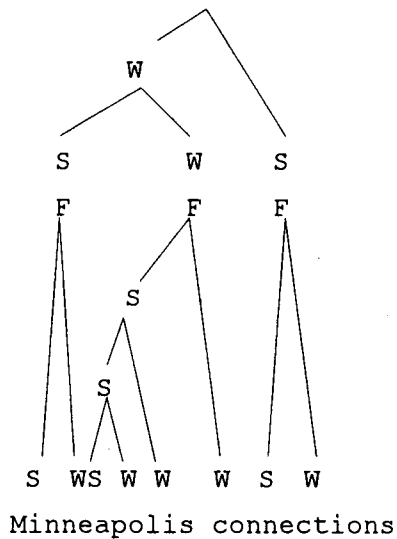
Three syllables intervene between the two designated terminal elements of two strong feet.

By Quadrisyllabic Eurhythmcy, stress patterning in (13a) may be evaluated as most eurhythmic and that in (13b) as most unnatural:

(13) a. Phonological Phrase

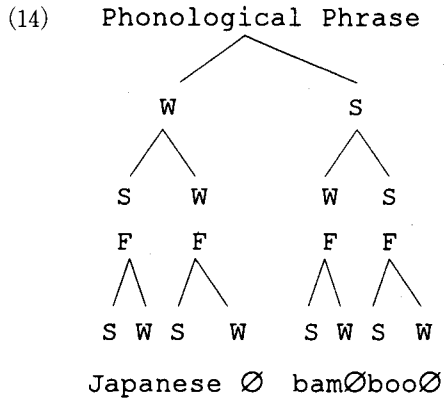


b. Phonological Phrase

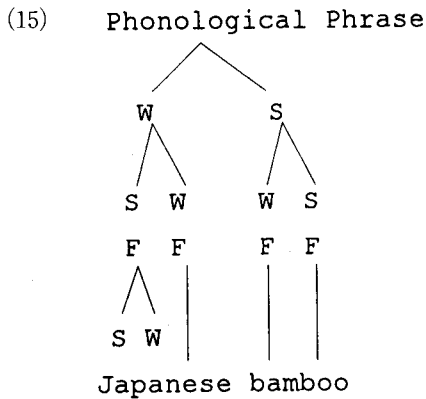


In (13a) three syllables intervene between the two DTE's: (i) *Ten-* and (ii) *-nec-*. In (13b) there are five syllables between the two DTE's: (i) *Min-* and (ii) *-nec-*. Five syllables are too excessive for eurhythmcy. The naturalness of the initial word stress in *Japanese bamboo*

will be accounted for as follows. The relevant metrical structure is shown in (14):



I assume that long vowels and diphthongs may constitute degenerate feet while short vowels may not. Thus the word *strong* may be followed by a null element but the word-final long vowel of "Japanese" and the diphthong in *straight* have degenerate feet. (This assumption applies only to English phonology and it is but a stipulation) Therefore (15) will be rewritten into (15):



The DTE's are *Ja-* and *-boo-* between these two syllables are three syllables, which satisfies the requirement of the Quadrisyllable Eurhythmy.

References

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